PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Attorney Docket No. 13148US02

In the Application of:	A. J. Carlson	Conf. No.:	7713
		Customer No.:	23446
Serial No.:	09/882,100	**EXPRESS MAIL**	
Filed:	June 15, 2001	Label No.:	EV 729163790 US
For:	METHOD OF INTELLIGENTLY RESTRICTING SYMBOL SIZE IN ADSL MODEMS	Dated:	February 27, 2006.
Examiner:	J. M. Perilla		
Group Art Unit:	2638		

BRIEF ON APPEAL

MS: Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an appeal from an Office Action dated October 17, 2005, in which claims 1-20 were finally rejected.

REAL PARTY IN INTEREST
(37 C.F.R. § 41.37(c)(1)(i))

Broadcom Corporation, a corporation organized under the laws of the state of California, and having a place of business at 16215 Alton Parkway, Irvine, California 92618-3616, has acquired the entire right, title and interest in and to the invention, the application, and any and all

patents to be obtained therefor, as set forth in the Assignment recorded at Reel 012204, Frame 0771 in the PTO assignment search room.

RELATED APPEALS AND INTERFERENCES
(37 C.F.R. § 41.37(c)(1)(ii))

Not applicable.

STATUS OF THE CLAIMS
(37 C.F.R. § 41.37(c)(1)(iii))

The present application originally included 20 claims.[1] The Examiner rejected claims 1-20.[2] Applicant filed a response to the rejection of claims 1-20.[3] The Examiner maintained rejection of claims 1-20 presenting the same arguments in a Final Office Action.[4] Application filed a response to the final rejection of claim 1-20 within two months of the Final Office Action. [5] The Examiner maintained rejection of claim 1-20 in an advisory action. [6] Claims 1-20 are pending and remain rejected. Applicant identifies claims 1-20 as the claims that are being appealed. The text of the pending claims is provided in the Claims Appendix.

STATUS OF AMENDMENTS
(37 C.F.R. § 41.37(c)(1)(iv))

Not applicable.

SUMMARY OF CLAIMED SUBJECT MATTER
(37 C.F.R. § 41.37(c)(1)(v))

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[1] See Present Application ("Application") at pages 14-17.
[2] See February 23, 2005 Office Action at page 2.
[3] See May 23, 2005 Response, page 5-7.
[4] See July 26, 2005 Office Action at page 2.
[5] See September 26, 2005 Office Action.
[6] See October 17, 2005 Advisory Action.

Embodiments of the present invention generally relate to improvements in an ADSL communication system, and more particularly to restricting symbol size in an ADSL system.[7]

Claim 1 is directed to a method in an ADSL system whereby symbol size is restricted. The method comprises obtaining information regarding a **data rate** during initialization, and comparing the information to a threshold. If the information is above the threshold, the method further comprises transmitting symbols using one of a multiple of 8, 4, or 2 bits per symbol. However, if the information is below the threshold, the method further comprises transmitting symbols using an integer number of bits per symbol.

The invention of claim 1 is illustratively described in the Specification of the present application at, for example, the last paragraph on page 9 referring to Figure 7. Fig. 7 shows a flow chart detailing a process by which a multiple of 8 bits per symbol is selected for transmission. The process involves a transmitter obtaining information regarding a data rate estimated during initialization (block 701). If the data rate is determined to be high or "above a threshold (block 703)", the transmitter transmits symbols using a multiple of 8 bits per symbol (block 705). If, on the other hand, the "data rate is determined to be low (i.e. below the threshold), the transmitter" transmits symbols using "any integer number of bits per symbol." Similar description is presented in the application with regards to transmission at 4 bits per symbol (Figure 8) and 2 bits per symbol (Figure 9) instead of 8 bits per symbol. The invention of claim 1 is also described in other parts of the present application, such as in the Summary of the Invention section.

Claims 2-6 are dependent upon claim 1.

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[7] See present application at page 3.

Claim 7 is directed to a method in an ADSL system whereby symbol size is restricted. The method comprises obtaining information regarding a **data rate** during initialization, and comparing the information to a threshold. If the information is above the threshold, the method further comprises transmitting symbols using one of a multiple of 8, 4, or 2 bits per symbol. However, if the information is below the threshold, the method further comprises transmitting symbols without restriction as to the size of symbols.

The invention of claim 7 is illustratively described in the Specification of the present application at, for example, the last paragraph on page 9 referring to Figure 7. Fig. 7 shows a flow chart detailing a process by which a multiple of 8 bits per symbol is selected for transmission. The process involves a transmitter obtaining information regarding a data rate estimated during initialization (block 701). If the data rate is determined to be high or "above a threshold (block 703)", the transmitter transmits symbols using a multiple of 8 bits per symbol (block 705). If, on the other hand, the "data rate is determined to be low (i.e. below the threshold), the transmitter" transmits symbols "without restriction to the size of the symbol (block 707)." Similar description is presented in the application with regards to transmission at 4 bits per symbol (Figure 8) and 2 bits per symbol (Figure 9) instead of 8 bits per symbol. The invention of claim 7 is also described in other parts of the present application, such as in the Summary of the Invention section.

Claims 8-12 are dependent upon claim 7.

Claim 13 is directed to an ADSL system having a first modem and second modem. The first modem has a first transmitter and a first receiver. The second modem has a second transmitter and a second receiver. The second modem estimates a maximum receive **data rate** of the first modem and compares it to a threshold. The second transmitter transmits a message to

the first receiver instructing the first transmitter to transmit data using a pre-selected number of bits per symbol based on the comparison of the data rate to the threshold.

The invention of claim 13 is illustratively described in the Specification of the present application at, for example, the first and second paragraphs on page 5 referring to Figure 1. Fig. 1 shows a block diagram of an ADSL modem system which has a "customer premises modem 101" and "a central office modem 111." The customer premises (first) modem "comprises a transmitter 105, [and] a receiver 103." The central office (second) modem "comprises a transmitter 115, [and] a receiver 114." During modem training, "the customer premises modem 101 estimates the maximum receive data rate ... [and] compares this maximum receive data rate to a threshold." "Depending upon the result of that comparison" the transmitter 105 is then be instructed to transmit a command to the central office modem 111. The receiver 114 processes the command and the transmitter 115 is then configured to transmit a number of bits per symbol, accordingly. The invention of claim 13 is also described in other parts of the present application, such as in the Summary of the Invention section.

Claims 14-20 are dependent upon claim 13.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL (37 C.F.R. § 41.37(c)(1)(vi))

Claims 1-20 stand rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,546,090 ("Bremer") in view of United States Patent No. 6,262,994 ("Dirschedl").

ARGUMENT
(37 C.F.R. § 41.37(c)(1)(vii))

The Examiner has maintained the rejection of claims 1-20 as being unpatentable over Bremer in view of Dirschedl. None of these references, however, teach, suggest, or disclose a "obtaining information regarding a Data rate" (claims 1 and 7) or "estimating a maximum receive data rate" (claim 13), as recited in the present application. Therefore, these rejections are improper and should be reversed.

In order for a *prima facie* case of obviousness to be established, the Manual of Patent Examining Procedure (MPEP) states the following:

> First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine the teaching. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.[8]

The law is well settled that "obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion or incentive to do so."[9] It is not permissible to pick and choose among the individual elements of assorted prior art references to re-create the claimed invention, but rather "some teaching or

[8] Manual of Patent Examining Procedure MPEP at § 2142, citing In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).
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suggestion in the references to support their use in the particular claimed combination" is needed.[10]

Additionally, if a *prima facie* case of obviousness is not established, Applicant is under no obligation to submit evidence of nonobviousness.

> The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.[11]

DIRSCHEDL DOES NOT TEACH A SYSTEM OR A METHOD FOR OBTAINING INFORMATION REGARDING DATA RATE

Dirschedl discloses an arrangement in a communication system for optimization of data transmission. A type of modulation is selected at the transmitter side and the code rate of the forward error correction and the power of the transmitter devices are provided at the reception side for the determination of the error rate. The data packet size, and/or the type of modulation used, and/or the power of the transmitter is varied, **dependent on the error rate transmitted back**, such that a predetermined error rate is achieved at the reception side.[12] Dirschedl clearly and unequivocally indicates that data regarding the error rate is collected and used to select characteristics of transmission:

> Devices at the reception side of the channel **determine an error rate**. A device at the transmitter side varies at least one of a size of data packets, type of modulation, code rate, and power of the transmitter **as a function of the error rate** that is transmitted back from the reception side...[13]

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[10] Symbol Technologies, Inc. v. Opticon, Inc. 935 F.2d 1569, 1576, 19 USPQ2d 1241 (Fed. Cir. 1991)
[11] See Manual of Patent Examining Procedure MPEP at § 2142.
[12] See, e.g., Dirschedl at Abstract.
[13] Id. at column 1, lines 35-40 (emphasis added).

Dirschedl clearly teaches a system in which **error rate is determined**, and based on that determining certain characteristics that govern the transmission of data in the described system. No other option is described or even suggested. Indeed, the system in Dirschedl determines the error rate and based on that determination selects a code rate for the transmission of data. Thus, Dirschedl does not teach, nor does it suggest, a method of "obtaining information regarding a data rate," and choosing a symbol size (bits per symbol) for transmission of data based on the data rate obtained, such as recited in claims 1, 7, and 13 of the present application. In fact, as shown above, Dirschedl teaches that code rate is selected "as a function of the error rate" that is determined at the reception side.

The Office Action states the following:

> Applicant insists that the prior art reference Dirschedl discloses determining an error rate and not the claimed data rate. However, as broadly as claimed, the determination of an error rate is regarded as the determination of information regarding the data rate. That is, the error rate is a rate of errors in the data which is transmitted. As understood by one having skill in the art, "a data rate" does encompass data received correctly against data which is not recovered due to errors in the transmission. While the Applicant states that the prior art rejections do not disclose determining "a data rate", the Examiner notes that the prior art rejections disclose determining at least the claimed "information regarding a data rate" or error rate of the data.[14]

Applicant respectfully disagrees with the following: (i) that error rate is information regarding a data rate; and (ii) the implication that Dirschedl determination of an error rate is equivalent to determination of data rate.

Dirschedl's system requires the determination of error rate to select the characteristics of the system. These characteristics include "at least one of a size of data packets, type of

[14] *See* July 26, 2005 Office Action at page 2.

modulation, code rate, and power of the transmitter." Dirschedl teaches transmitting information about the transmission quality, i.e. the error rate, and based on the determination, suitably selecting the characteristics listed hereinabove to improve transmission quality, "i.e. at a minimal error rate, to change one or more of these setting variables so that user data can be transmitted at a higher data rate."

Dirschedl simply does not teach, nor suggest, that the variables of the system, i.e. the characteristics of the transmission are selected based on the data rate. Instead, Dirschedl teaches that selecting these variables is based on a determined error rate value and that changing these variables causes the data rate to change. Dirschedl neither suggests, nor can the system disclosed in Dirschedl be interpreted to suggest that error rate and data rate are two related values, whereby error rate can be determined from the data rate, as suggested by the Examiner. Dirschedl indicates that changes in the variables of transmission based on the error rate causes changes in the data rate. That does not necessarily mean that there is a direct relationship between the error rate and the data rate of a transmission as implied by the Examiner.

As Applicant has indicated previously, a **data rate** may be defined as "the rate at which a channel carries data, measured in bits per second, also known as data signaling rate.... In short, data rate is the measurement of how quickly data is transmitted."[15] Simply stated, a **data rate** may be defined as "the speed at which a circuit of communications line can transmit information, usually measured in bits per second (bps)."[16] Therefore, contrary to the Examiner's statement, the data rate simply measures **the speed at which data is transmitted in a communications channel**, regardless of the amount of "data received correctly against data which is not recovered

[15] See, e.g., Newton's Telecom Dictionary, 21st Edition, 2005, page 236
[16] See, e.g., Microsoft Press Computer Dictionary, Third Edition, 1997, page 132

due to error in transmission." The measure of data rate, which is in bits per second, does not provide any indication of the amount of error of a transmitted signal but merely the amount of data that is transmitted through a channel. The data transmitted may comprise correct and erroneous data, however, the data rate is only indicative of the amount of data being transmitted regardless of whether it is correct or not.

Additionally, **error rate** may be defined as "the ratio of the number of incorrect elements transmitted to the total number of elements transmitted."[17] Therefore, the error rate is simply **a ratio of two numbers, the number of erroneous bits in a group of transmitted bits**, which is a value independent of the data rate of the transmission.

Therefore, for example, two communications systems with two different data rates can have the same value for error rate, therefore, the data rate of a communications system is not indicative of the error rate associated with the communications system, and as a result, and contrary to the Examiner's opinion, the error rate cannot simply indicate anything about the data rate.

Additionally, Examiner's statement that "the error rate of the data transmission in an obvious corollary to the maximum receive data rate"[18] of claim 13 is incorrect. More specifically, the Examiner implies that a higher error rate is indicative of a lower maximum receive data rate, and vice versa. Hence implying that systems with higher data rates always have lower error rates that systems with lower data rates, a notion that is clearly erroneous, as discussed hereinabove. For example, two system with the same data rate can have two different

[17] *See*, e.g., Newton's Telecom Dictionary, 21st Edition, 2005, page 314
[18] *See* October 17, 2005 Advisory Action at page 4.

error rates, as such, one of the error rates is lower than the other, but the lower error rate would not be associated with a higher data rate.

CONCLUSION

None of the references cited against the pending claims of the application teaches or suggests using the data rate, or information thereabout, of transmission in a communication system to select the number of bits per symbol to be used in transmission of data in the system. Applicant respectfully submits that the Office Action fails to account for the entire disclosure of Dirschedl in its entirety, which clearly teaches away from "obtaining information regarding a data rate" (claims 1 and 7) or "estimating a maximum receive data rate" (claim 13), to be used in using one of a multiple of number of bits per symbol for data transmission as recited in the present application. Thus, the Office Action has not established a *prima facie* case of obviousness with respect to claims 1-20.

In attempting to combine Bremer with Dirschedl, the Examiner has replaced two characteristics of communication systems, the distinction between which is significant, and therefore distinguishes between the prior art references and Applicant's claimed invention. While the Office Action offers unsupported conclusions to read the prior art into Applicant's claimed invention, those conclusions are based only on erroneous definitions of terms of art well known by one having skill in the art and clearly differently defined by dictionaries.

As discussed above, the Applicant respectfully submits that the pending claims are allowable in all respects. Therefore, the Board is respectfully requested to reverse the rejections of pending claims 1-20.

PAYMENT OF FEES

The Commissioner is hereby authorized to charge additional fees or credit overpayments to the deposit account of McAndrews, Held & Malloy, Account No. 13-0017.

Dated: February 27, 2006

Respectfully submitted,

Christopher C. Winslade
Registration No. 36,308
Attorney for Applicant

McANDREWS, HELD & MALLOY, LTD.
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CLAIMS APPENDIX
(37 C.F.R. § 41.37(c)(1)(viii))

1. A method of restricting symbol size in an ADSL system comprising:

obtaining information regarding a data rate during initialization;

comparing the information to a threshold;

transmitting symbols using one of a multiple of 8, 4 or 2 bits per symbol if the information is above the threshold; and

transmitting symbols using an integer number of bits per symbol if the information is below the threshold.

2. The method of claim 1 wherein the information is obtained from a remote location.

3. The method of claim 1 wherein the information regarding the data rate comprises an estimated maximum receive data rate.

4. The method of claim 1 wherein the threshold is one of approximately 1 Mbits per second or approximately 250 Kbits per second, and wherein the symbols are transmitted using a multiple of 8 bits per symbol if the information is above the threshold.

5. The method of claim 1 wherein the threshold is one of approximately 2 Mbits per second or approximately 500 Kbits per second, and wherein the symbols are transmitted using a multiple of 4 bits per symbol if the information is above the threshold.

6. The method of claim 1 wherein the threshold is one of approximately 3 Mbits per second or approximately 750 Kbits per second, and wherein the symbols are transmitted using a multiple of 2 bits per symbol if the information is above the threshold.

7. A method of restricting symbol size in an ADSL system comprising:

obtaining information regarding a data rate during initialization;

comparing the information to a threshold;

transmitting a message to choose a symbol size that is one of a multiple of 8, 4 or 2 bits per symbol if the information is above the threshold; and

transmitting a message without restriction as to the size of symbols if the information is below the threshold.

8. The method of claim 7 wherein the information is obtained from a remote location.

9. The method of claim 7 wherein the information regarding the data rate comprises an estimated maximum receive data rate.

10. The method of claim 7 wherein the threshold is one of approximately 1 Mbits per second or approximately 250 Kbits per second, and wherein the message is transmitted to choose a symbol size that is a multiple of 8 if the information is above the threshold.

11. The method of claim 7 wherein the threshold is one of approximately 2 Mbits per second or approximately 500 Kbits per second, and wherein the message is transmitted to choose a symbol size that is a multiple of 4 if the information is above the threshold.

12. The method of claim 7 wherein the threshold is one of approximately 3 Mbits per second or approximately 750 Kbits per second, and wherein the message is transmitted to choose a symbol size that is a multiple of 2 if the information is above the threshold.

13. An ADSL modem system comprising:

a first modem having a first transmitter and a first receiver;

a second modem having a second transmitter and a second receiver, the second modem estimating a maximum receive data rate of the first modem and comparing it to a threshold, the second transmitter transmitting a message to the first receiver that instructs the first transmitter to transmit data using a pre-selected number of bits per symbol based on the comparison.

14. The ADSL modem system of claim 13 wherein the pre-selected number of bits per symbol is one of a multiple of 8, 4, 2 or 1.

15. The ADSL modem system of claim 14 wherein the threshold is one of approximately 1 Mbits per second or approximately 250 Kbits per second, and wherein the pre-selected number of bits per symbol is 8 if the maximum receive data rate is above the threshold.

16. The ADSL modem system of claim 14 wherein the threshold is one of approximately 2 Mbits per second or approximately 500 Kbits per second, and wherein the pre-selected number of bits per symbol is 4 if the maximum receive data rate is above the threshold.

17. The ADSL modem system of claim 14 wherein the threshold is one of approximately 3 Mbits per second or approximately 750 Kbits per second, and wherein the pre-selected number of bits per symbol is 2 if the maximum receive data rate is above the threshold.

18. The ADSL modem system of claim 14 wherein the second receiver receives a training signal that is used to estimate the maximum receive data rate of the first modem.

19. The ADSL modem system of claim 14 wherein the second modem further has a manager that estimates the maximum receive data rate of the first modem and compares the estimated maximum receive data rate to the threshold.

20. The ADSL modem of claim 14 wherein the first modem further has a manger that configures the first transmitter to transmit data using the pre-selected number of bits per symbol based on the comparison.

EVIDENCE APPENDIX
(37 C.F.R. § 41.37(c)(1)(ix))

(1) United States Patent No. 6,546,090 ("Bremer"), entered into record by Examiner in February 23, 2005 Office Action.

(2) United States Patent No. 6,262,994 ("Dirschedl"), entered into record by Examiner in February 23, 2005 Office Action.

RELATED PROCEEDINGS APPENDIX
(37 C.F.R. § 41.37(c)(1)(x))

Not applicable.

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patents to be obtained therefor, as set forth in the Assignment recorded at Reel 012204, Frame 0771 in the PTO assignment search room.

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Not applicable.

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STATUS OF AMENDMENTS
(37 C.F.R. § 41.37(c)(1)(iv))

Not applicable.

SUMMARY OF CLAIMED SUBJECT MATTER
(37 C.F.R. § 41.37(c)(1)(v))

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[1] See Present Application ("Application") at pages 14-17.
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The invention of claim 1 is illustratively described in the Specification of the present application at, for example, the last paragraph on page 9 referring to Figure 7. Fig. 7 shows a flow chart detailing a process by which a multiple of 8 bits per symbol is selected for transmission. The process involves a transmitter obtaining information regarding a data rate estimated during initialization (block 701). If the data rate is determined to be high or "above a threshold (block 703)", the transmitter transmits symbols using a multiple of 8 bits per symbol (block 705). If, on the other hand, the "data rate is determined to be low (i.e. below the threshold), the transmitter" transmits symbols using "any integer number of bits per symbol." Similar description is presented in the application with regards to transmission at 4 bits per symbol (Figure 8) and 2 bits per symbol (Figure 9) instead of 8 bits per symbol. The invention of claim 1 is also described in other parts of the present application, such as in the Summary of the Invention section.

Claims 2-6 are dependent upon claim 1.

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Claim 7 is directed to a method in an ADSL system whereby symbol size is restricted. The method comprises obtaining information regarding a **data rate** during initialization, and comparing the information to a threshold. If the information is above the threshold, the method further comprises transmitting symbols using one of a multiple of 8, 4, or 2 bits per symbol. However, if the information is below the threshold, the method further comprises transmitting symbols without restriction as to the size of symbols.

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ARGUMENT
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> The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.[11]

DIRSCHEDL DOES NOT TEACH A SYSTEM OR A METHOD FOR OBTAINING INFORMATION REGARDING DATA RATE

Dirschedl discloses an arrangement in a communication system for optimization of data transmission. A type of modulation is selected at the transmitter side and the code rate of the forward error correction and the power of the transmitter devices are provided at the reception side for the determination of the error rate. The data packet size, and/or the type of modulation used, and/or the power of the transmitter is varied, **dependent on the error rate transmitted back**, such that a predetermined error rate is achieved at the reception side.[12] Dirschedl clearly and unequivocally indicates that data regarding the error rate is collected and used to select characteristics of transmission:

> Devices at the reception side of the channel **determine an error rate**. A device at the transmitter side varies at least one of a size of data packets, type of modulation, code rate, and power of the transmitter **as a function of the error rate** that is transmitted back from the reception side...[13]

---

[10] Symbol Technologies, Inc. v. Opticon, Inc. 935 F.2d 1569, 1576, 19 USPQ2d 1241 (Fed. Cir. 1991)
[11] See Manual of Patent Examining Procedure MPEP at § 2142.
[12] See, e.g., Dirschedl at Abstract.
[13] Id. at column 1, lines 35-40 (emphasis added).

Dirschedl clearly teaches a system in which **error rate is determined**, and based on that determining certain characteristics that govern the transmission of data in the described system. No other option is described or even suggested. Indeed, the system in Dirschedl determines the error rate and based on that determination selects a code rate for the transmission of data. Thus, Dirschedl does not teach, nor does it suggest, a method of "obtaining information regarding a data rate," and choosing a symbol size (bits per symbol) for transmission of data based on the data rate obtained, such as recited in claims 1, 7, and 13 of the present application. In fact, as shown above, Dirschedl teaches that code rate is selected "as a function of the error rate" that is determined at the reception side.

The Office Action states the following:

> Applicant insists that the prior art reference Dirschedl discloses determining an error rate and not the claimed data rate. However, as broadly as claimed, the determination of an error rate is regarded as the determination of information regarding the data rate. That is, the error rate is a rate of errors in the data which is transmitted. As understood by one having skill in the art, "a data rate" does encompass data received correctly against data which is not recovered due to errors in the transmission. While the Applicant states that the prior art rejections do not disclose determining "a data rate", the Examiner notes that the prior art rejections disclose determining at least the claimed "information regarding a data rate" or error rate of the data.[14]

Applicant respectfully disagrees with the following: (i) that error rate is information regarding a data rate; and (ii) the implication that Dirschedl determination of an error rate is equivalent to determination of data rate.

Dirschedl's system requires the determination of error rate to select the characteristics of the system. These characteristics include "at least one of a size of data packets, type of

[14] *See* July 26, 2005 Office Action at page 2.

modulation, code rate, and power of the transmitter." Dirschedl teaches transmitting information about the transmission quality, i.e. the error rate, and based on the determination, suitably selecting the characteristics listed hereinabove to improve transmission quality, "i.e. at a minimal error rate, to change one or more of these setting variables so that user data can be transmitted at a higher data rate."

Dirschedl simply does not teach, nor suggest, that the variables of the system, i.e. the characteristics of the transmission are selected based on the data rate. Instead, Dirschedl teaches that selecting these variables is based on a determined error rate value and that changing these variables causes the data rate to change. Dirschedl neither suggests, nor can the system disclosed in Dirschedl be interpreted to suggest that error rate and data rate are two related values, whereby error rate can be determined from the data rate, as suggested by the Examiner. Dirschedl indicates that changes in the variables of transmission based on the error rate causes changes in the data rate. That does not necessarily mean that there is a direct relationship between the error rate and the data rate of a transmission as implied by the Examiner.

As Applicant has indicated previously, a **data rate** may be defined as "the rate at which a channel carries data, measured in bits per second, also known as data signaling rate.... In short, data rate is the measurement of how quickly data is transmitted."[15] Simply stated, a **data rate** may be defined as "the speed at which a circuit of communications line can transmit information, usually measured in bits per second (bps)."[16] Therefore, contrary to the Examiner's statement, the data rate simply measures **the speed at which data is transmitted in a communications channel**, regardless of the amount of "data received correctly against data which is not recovered

[15] See, e.g., Newton's Telecom Dictionary, 21st Edition, 2005, page 236
[16] See, e.g., Microsoft Press Computer Dictionary, Third Edition, 1997, page 132

due to error in transmission." The measure of data rate, which is in bits per second, does not provide any indication of the amount of error of a transmitted signal but merely the amount of data that is transmitted through a channel. The data transmitted may comprise correct and erroneous data, however, the data rate is only indicative of the amount of data being transmitted regardless of whether it is correct or not.

Additionally, **error rate** may be defined as "the ratio of the number of incorrect elements transmitted to the total number of elements transmitted."[17] Therefore, the error rate is simply **a ratio of two numbers, the number of erroneous bits in a group of transmitted bits**, which is a value independent of the data rate of the transmission.

Therefore, for example, two communications systems with two different data rates can have the same value for error rate, therefore, the data rate of a communications system is not indicative of the error rate associated with the communications system, and as a result, and contrary to the Examiner's opinion, the error rate cannot simply indicate anything about the data rate.

Additionally, Examiner's statement that "the error rate of the data transmission in an obvious corollary to the maximum receive data rate"[18] of claim 13 is incorrect. More specifically, the Examiner implies that a higher error rate is indicative of a lower maximum receive data rate, and vice versa. Hence implying that systems with higher data rates always have lower error rates that systems with lower data rates, a notion that is clearly erroneous, as discussed hereinabove. For example, two system with the same data rate can have two different

[17] *See*, e.g., Newton's Telecom Dictionary, 21st Edition, 2005, page 314
[18] *See* October 17, 2005 Advisory Action at page 4.

error rates, as such, one of the error rates is lower than the other, but the lower error rate would not be associated with a higher data rate.

CONCLUSION

None of the references cited against the pending claims of the application teaches or suggests using the data rate, or information thereabout, of transmission in a communication system to select the number of bits per symbol to be used in transmission of data in the system. Applicant respectfully submits that the Office Action fails to account for the entire disclosure of Dirschedl in its entirety, which clearly teaches away from "obtaining information regarding a data rate" (claims 1 and 7) or "estimating a maximum receive data rate" (claim 13), to be used in using one of a multiple of number of bits per symbol for data transmission as recited in the present application. Thus, the Office Action has not established a *prima facie* case of obviousness with respect to claims 1-20.

In attempting to combine Bremer with Dirschedl, the Examiner has replaced two characteristics of communication systems, the distinction between which is significant, and therefore distinguishes between the prior art references and Applicant's claimed invention. While the Office Action offers unsupported conclusions to read the prior art into Applicant's claimed invention, those conclusions are based only on erroneous definitions of terms of art well known by one having skill in the art and clearly differently defined by dictionaries.

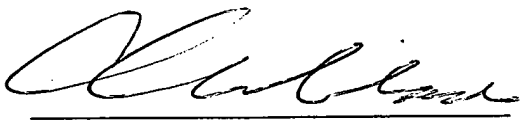
As discussed above, the Applicant respectfully submits that the pending claims are allowable in all respects. Therefore, the Board is respectfully requested to reverse the rejections of pending claims 1-20.

PAYMENT OF FEES

The Commissioner is hereby authorized to charge additional fees or credit overpayments to the deposit account of McAndrews, Held & Malloy, Account No. 13-0017.

Dated: February 27, 2006

Respectfully submitted,



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CLAIMS APPENDIX
(37 C.F.R. § 41.37(c)(1)(viii))

1. A method of restricting symbol size in an ADSL system comprising:

obtaining information regarding a data rate during initialization;

comparing the information to a threshold;

transmitting symbols using one of a multiple of 8, 4 or 2 bits per symbol if the information is above the threshold; and

transmitting symbols using an integer number of bits per symbol if the information is below the threshold.

2. The method of claim 1 wherein the information is obtained from a remote location.

3. The method of claim 1 wherein the information regarding the data rate comprises an estimated maximum receive data rate.

4. The method of claim 1 wherein the threshold is one of approximately 1 Mbits per second or approximately 250 Kbits per second, and wherein the symbols are transmitted using a multiple of 8 bits per symbol if the information is above the threshold.

5. The method of claim 1 wherein the threshold is one of approximately 2 Mbits per second or approximately 500 Kbits per second, and wherein the symbols are transmitted using a multiple of 4 bits per symbol if the information is above the threshold.

6. The method of claim 1 wherein the threshold is one of approximately 3 Mbits per second or approximately 750 Kbits per second, and wherein the symbols are transmitted using a multiple of 2 bits per symbol if the information is above the threshold.

7. A method of restricting symbol size in an ADSL system comprising:

obtaining information regarding a data rate during initialization;

comparing the information to a threshold;

transmitting a message to choose a symbol size that is one of a multiple of 8, 4 or 2 bits per symbol if the information is above the threshold; and

transmitting a message without restriction as to the size of symbols if the information is below the threshold.

8. The method of claim 7 wherein the information is obtained from a remote location.

9. The method of claim 7 wherein the information regarding the data rate comprises an estimated maximum receive data rate.

10. The method of claim 7 wherein the threshold is one of approximately 1 Mbits per second or approximately 250 Kbits per second, and wherein the message is transmitted to choose a symbol size that is a multiple of 8 if the information is above the threshold.

11. The method of claim 7 wherein the threshold is one of approximately 2 Mbits per second or approximately 500 Kbits per second, and wherein the message is transmitted to choose a symbol size that is a multiple of 4 if the information is above the threshold.

12. The method of claim 7 wherein the threshold is one of approximately 3 Mbits per second or approximately 750 Kbits per second, and wherein the message is transmitted to choose a symbol size that is a multiple of 2 if the information is above the threshold.

13. An ADSL modem system comprising:

a first modem having a first transmitter and a first receiver;

a second modem having a second transmitter and a second receiver, the second modem estimating a maximum receive data rate of the first modem and comparing it to a threshold, the second transmitter transmitting a message to the first receiver that instructs the first transmitter to transmit data using a pre-selected number of bits per symbol based on the comparison.

14. The ADSL modem system of claim 13 wherein the pre-selected number of bits per symbol is one of a multiple of 8, 4, 2 or 1.

15. The ADSL modem system of claim 14 wherein the threshold is one of approximately 1 Mbits per second or approximately 250 Kbits per second, and wherein the pre-selected number of bits per symbol is 8 if the maximum receive data rate is above the threshold.

16. The ADSL modem system of claim 14 wherein the threshold is one of approximately 2 Mbits per second or approximately 500 Kbits per second, and wherein the pre-selected number of bits per symbol is 4 if the maximum receive data rate is above the threshold.

17. The ADSL modem system of claim 14 wherein the threshold is one of approximately 3 Mbits per second or approximately 750 Kbits per second, and wherein the pre-selected number of bits per symbol is 2 if the maximum receive data rate is above the threshold.

18. The ADSL modem system of claim 14 wherein the second receiver receives a training signal that is used to estimate the maximum receive data rate of the first modem.

19. The ADSL modem system of claim 14 wherein the second modem further has a manager that estimates the maximum receive data rate of the first modem and compares the estimated maximum receive data rate to the threshold.

20. The ADSL modem of claim 14 wherein the first modem further has a manger that configures the first transmitter to transmit data using the pre-selected number of bits per symbol based on the comparison.

EVIDENCE APPENDIX
(37 C.F.R. § 41.37(c)(1)(ix))

(1) United States Patent No. 6,546,090 ("Bremer"), entered into record by Examiner in February 23, 2005 Office Action.

(2) United States Patent No. 6,262,994 ("Dirschedl"), entered into record by Examiner in February 23, 2005 Office Action.

RELATED PROCEEDINGS APPENDIX
(37 C.F.R. § 41.37(c)(1)(x))

Not applicable.

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Attorney Docket No. 13148US02

In the Application of:	A. J. Carlson	Conf. No.:	7713
		Customer No.:	23446
Serial No.:	09/882,100	**EXPRESS MAIL**	
Filed:	June 15, 2001	Label No.:	EV 729163790 US
For:	METHOD OF INTELLIGENTLY RESTRICTING SYMBOL SIZE IN ADSL MODEMS	Dated:	February 27, 2006.
Examiner:	J. M. Perilla		
Group Art Unit:	2638		

BRIEF ON APPEAL

MS: Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an appeal from an Office Action dated October 17, 2005, in which claims 1-20 were finally rejected.

REAL PARTY IN INTEREST
(37 C.F.R. § 41.37(c)(1)(i))

Broadcom Corporation, a corporation organized under the laws of the state of California, and having a place of business at 16215 Alton Parkway, Irvine, California 92618-3616, has acquired the entire right, title and interest in and to the invention, the application, and any and all

patents to be obtained therefor, as set forth in the Assignment recorded at Reel 012204, Frame 0771 in the PTO assignment search room.

RELATED APPEALS AND INTERFERENCES
(37 C.F.R. § 41.37(c)(1)(ii))

Not applicable.

STATUS OF THE CLAIMS
(37 C.F.R. § 41.37(c)(1)(iii))

The present application originally included 20 claims.[1] The Examiner rejected claims 1-20.[2] Applicant filed a response to the rejection of claims 1-20.[3] The Examiner maintained rejection of claims 1-20 presenting the same arguments in a Final Office Action.[4] Application filed a response to the final rejection of claim 1-20 within two months of the Final Office Action. [5] The Examiner maintained rejection of claim 1-20 in an advisory action. [6] Claims 1-20 are pending and remain rejected. Applicant identifies claims 1-20 as the claims that are being appealed. The text of the pending claims is provided in the Claims Appendix.

STATUS OF AMENDMENTS
(37 C.F.R. § 41.37(c)(1)(iv))

Not applicable.

SUMMARY OF CLAIMED SUBJECT MATTER
(37 C.F.R. § 41.37(c)(1)(v))

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[1] See Present Application ("Application") at pages 14-17.
[2] See February 23, 2005 Office Action at page 2.
[3] See May 23, 2005 Response, page 5-7.
[4] See July 26, 2005 Office Action at page 2.
[5] See September 26, 2005 Office Action.
[6] See October 17, 2005 Advisory Action.

Embodiments of the present invention generally relate to improvements in an ADSL communication system, and more particularly to restricting symbol size in an ADSL system.[7]

Claim 1 is directed to a method in an ADSL system whereby symbol size is restricted. The method comprises obtaining information regarding a **data rate** during initialization, and comparing the information to a threshold. If the information is above the threshold, the method further comprises transmitting symbols using one of a multiple of 8, 4, or 2 bits per symbol. However, if the information is below the threshold, the method further comprises transmitting symbols using an integer number of bits per symbol.

The invention of claim 1 is illustratively described in the Specification of the present application at, for example, the last paragraph on page 9 referring to Figure 7. Fig. 7 shows a flow chart detailing a process by which a multiple of 8 bits per symbol is selected for transmission. The process involves a transmitter obtaining information regarding a data rate estimated during initialization (block 701). If the data rate is determined to be high or "above a threshold (block 703)", the transmitter transmits symbols using a multiple of 8 bits per symbol (block 705). If, on the other hand, the "data rate is determined to be low (i.e. below the threshold), the transmitter" transmits symbols using "any integer number of bits per symbol." Similar description is presented in the application with regards to transmission at 4 bits per symbol (Figure 8) and 2 bits per symbol (Figure 9) instead of 8 bits per symbol. The invention of claim 1 is also described in other parts of the present application, such as in the Summary of the Invention section.

Claims 2-6 are dependent upon claim 1.

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[7] See present application at page 3.

Claim 7 is directed to a method in an ADSL system whereby symbol size is restricted. The method comprises obtaining information regarding a **data rate** during initialization, and comparing the information to a threshold. If the information is above the threshold, the method further comprises transmitting symbols using one of a multiple of 8, 4, or 2 bits per symbol. However, if the information is below the threshold, the method further comprises transmitting symbols without restriction as to the size of symbols.

The invention of claim 7 is illustratively described in the Specification of the present application at, for example, the last paragraph on page 9 referring to Figure 7. Fig. 7 shows a flow chart detailing a process by which a multiple of 8 bits per symbol is selected for transmission. The process involves a transmitter obtaining information regarding a data rate estimated during initialization (block 701). If the data rate is determined to be high or "above a threshold (block 703)", the transmitter transmits symbols using a multiple of 8 bits per symbol (block 705). If, on the other hand, the "data rate is determined to be low (i.e. below the threshold), the transmitter" transmits symbols "without restriction to the size of the symbol (block 707)." Similar description is presented in the application with regards to transmission at 4 bits per symbol (Figure 8) and 2 bits per symbol (Figure 9) instead of 8 bits per symbol. The invention of claim 7 is also described in other parts of the present application, such as in the Summary of the Invention section.

Claims 8-12 are dependent upon claim 7.

Claim 13 is directed to an ADSL system having a first modem and second modem. The first modem has a first transmitter and a first receiver. The second modem has a second transmitter and a second receiver. The second modem estimates a maximum receive **data rate** of the first modem and compares it to a threshold. The second transmitter transmits a message to

the first receiver instructing the first transmitter to transmit data using a pre-selected number of bits per symbol based on the comparison of the data rate to the threshold.

The invention of claim 13 is illustratively described in the Specification of the present application at, for example, the first and second paragraphs on page 5 referring to Figure 1. Fig. 1 shows a block diagram of an ADSL modem system which has a "customer premises modem 101" and "a central office modem 111." The customer premises (first) modem "comprises a transmitter 105, [and] a receiver 103." The central office (second) modem "comprises a transmitter 115, [and] a receiver 114." During modem training, "the customer premises modem 101 estimates the maximum receive data rate ... [and] compares this maximum receive data rate to a threshold." "Depending upon the result of that comparison" the transmitter 105 is then be instructed to transmit a command to the central office modem 111. The receiver 114 processes the command and the transmitter 115 is then configured to transmit a number of bits per symbol, accordingly. The invention of claim 13 is also described in other parts of the present application, such as in the Summary of the Invention section.

Claims 14-20 are dependent upon claim 13.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL (37 C.F.R. § 41.37(c)(1)(vi))

Claims 1-20 stand rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,546,090 ("Bremer") in view of United States Patent No. 6,262,994 ("Dirschedl").

ARGUMENT
(37 C.F.R. § 41.37(c)(1)(vii))

The Examiner has maintained the rejection of claims 1-20 as being unpatentable over Bremer in view of Dirschedl. None of these references, however, teach, suggest, or disclose a "obtaining information regarding a Data rate" (claims 1 and 7) or "estimating a maximum receive data rate" (claim 13), as recited in the present application. Therefore, these rejections are improper and should be reversed.

In order for a *prima facie* case of obviousness to be established, the Manual of Patent Examining Procedure (MPEP) states the following:

> First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine the teaching. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.[8]

The law is well settled that "obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion or incentive to do so."[9] It is not permissible to pick and choose among the individual elements of assorted prior art references to re-create the claimed invention, but rather "some teaching or

[8] Manual of Patent Examining Procedure MPEP at § 2142, citing In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).
[9] ACS Hospital Systems, Inc. v. Montfiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929 (Fed. Cir. 1984).

suggestion in the references to support their use in the particular claimed combination" is needed.[10]

Additionally, if a *prima facie* case of obviousness is not established, Applicant is under no obligation to submit evidence of nonobviousness.

> The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.[11]

DIRSCHEDL DOES NOT TEACH A SYSTEM OR A METHOD FOR OBTAINING INFORMATION REGARDING DATA RATE

Dirschedl discloses an arrangement in a communication system for optimization of data transmission. A type of modulation is selected at the transmitter side and the code rate of the forward error correction and the power of the transmitter devices are provided at the reception side for the determination of the error rate. The data packet size, and/or the type of modulation used, and/or the power of the transmitter is varied, **dependent on the error rate transmitted back**, such that a predetermined error rate is achieved at the reception side.[12] Dirschedl clearly and unequivocally indicates that data regarding the error rate is collected and used to select characteristics of transmission:

> Devices at the reception side of the channel **determine an error rate**. A device at the transmitter side varies at least one of a size of data packets, type of modulation, code rate, and power of the transmitter **as a function of the error rate** that is transmitted back from the reception side…[13]

---

[10] Symbol Technologies, Inc. v. Opticon, Inc. 935 F.2d 1569, 1576, 19 USPQ2d 1241 (Fed. Cir. 1991)
[11] See Manual of Patent Examining Procedure MPEP at § 2142.
[12] See, e.g., Dirschedl at Abstract.
[13] Id. at column 1, lines 35-40 (emphasis added).

Dirschedl clearly teaches a system in which **error rate is determined**, and based on that determining certain characteristics that govern the transmission of data in the described system. No other option is described or even suggested. Indeed, the system in Dirschedl determines the error rate and based on that determination selects a code rate for the transmission of data. Thus, Dirschedl does not teach, nor does it suggest, a method of "obtaining information regarding a data rate," and choosing a symbol size (bits per symbol) for transmission of data based on the data rate obtained, such as recited in claims 1, 7, and 13 of the present application. In fact, as shown above, Dirschedl teaches that code rate is selected "as a function of the error rate" that is determined at the reception side.

The Office Action states the following:

> Applicant insists that the prior art reference Dirschedl discloses determining an error rate and not the claimed data rate. However, as broadly as claimed, the determination of an error rate is regarded as the determination of information regarding the data rate. That is, the error rate is a rate of errors in the data which is transmitted. As understood by one having skill in the art, "a data rate" does encompass data received correctly against data which is not recovered due to errors in the transmission. While the Applicant states that the prior art rejections do not disclose determining "a data rate", the Examiner notes that the prior art rejections disclose determining at least the claimed "information regarding a data rate" or error rate of the data.[14]

Applicant respectfully disagrees with the following: (i) that error rate is information regarding a data rate; and (ii) the implication that Dirschedl determination of an error rate is equivalent to determination of data rate.

Dirschedl's system requires the determination of error rate to select the characteristics of the system. These characteristics include "at least one of a size of data packets, type of

[14] *See* July 26, 2005 Office Action at page 2.

modulation, code rate, and power of the transmitter." Dirschedl teaches transmitting information about the transmission quality, i.e. the error rate, and based on the determination, suitably selecting the characteristics listed hereinabove to improve transmission quality, "i.e. at a minimal error rate, to change one or more of these setting variables so that user data can be transmitted at a higher data rate."

Dirschedl simply does not teach, nor suggest, that the variables of the system, i.e. the characteristics of the transmission are selected based on the data rate. Instead, Dirschedl teaches that selecting these variables is based on a determined error rate value and that changing these variables causes the data rate to change. Dirschedl neither suggests, nor can the system disclosed in Dirschedl be interpreted to suggest that error rate and data rate are two related values, whereby error rate can be determined from the data rate, as suggested by the Examiner. Dirschedl indicates that changes in the variables of transmission based on the error rate causes changes in the data rate. That does not necessarily mean that there is a direct relationship between the error rate and the data rate of a transmission as implied by the Examiner.

As Applicant has indicated previously, a **data rate** may be defined as "the rate at which a channel carries data, measured in bits per second, also known as data signaling rate.... In short, data rate is the measurement of how quickly data is transmitted."[15] Simply stated, a **data rate** may be defined as "the speed at which a circuit of communications line can transmit information, usually measured in bits per second (bps)."[16] Therefore, contrary to the Examiner's statement, the data rate simply measures **the speed at which data is transmitted in a communications channel**, regardless of the amount of "data received correctly against data which is not recovered

[15] See, e.g., Newton's Telecom Dictionary, 21st Edition, 2005, page 236
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due to error in transmission." The measure of data rate, which is in bits per second, does not provide any indication of the amount of error of a transmitted signal but merely the amount of data that is transmitted through a channel. The data transmitted may comprise correct and erroneous data, however, the data rate is only indicative of the amount of data being transmitted regardless of whether it is correct or not.

Additionally, **error rate** may be defined as "the ratio of the number of incorrect elements transmitted to the total number of elements transmitted."[17] Therefore, the error rate is simply **a ratio of two numbers, the number of erroneous bits in a group of transmitted bits**, which is a value independent of the data rate of the transmission.

Therefore, for example, two communications systems with two different data rates can have the same value for error rate, therefore, the data rate of a communications system is not indicative of the error rate associated with the communications system, and as a result, and contrary to the Examiner's opinion, the error rate cannot simply indicate anything about the data rate.

Additionally, Examiner's statement that "the error rate of the data transmission in an obvious corollary to the maximum receive data rate"[18] of claim 13 is incorrect. More specifically, the Examiner implies that a higher error rate is indicative of a lower maximum receive data rate, and vice versa. Hence implying that systems with higher data rates always have lower error rates that systems with lower data rates, a notion that is clearly erroneous, as discussed hereinabove. For example, two system with the same data rate can have two different

[17] *See*, e.g., Newton's Telecom Dictionary, 21st Edition, 2005, page 314
[18] *See* October 17, 2005 Advisory Action at page 4.

error rates, as such, one of the error rates is lower than the other, but the lower error rate would not be associated with a higher data rate.

CONCLUSION

None of the references cited against the pending claims of the application teaches or suggests using the data rate, or information thereabout, of transmission in a communication system to select the number of bits per symbol to be used in transmission of data in the system. Applicant respectfully submits that the Office Action fails to account for the entire disclosure of Dirschedl in its entirety, which clearly teaches away from "obtaining information regarding a data rate" (claims 1 and 7) or "estimating a maximum receive data rate" (claim 13), to be used in using one of a multiple of number of bits per symbol for data transmission as recited in the present application. Thus, the Office Action has not established a *prima facie* case of obviousness with respect to claims 1-20.

In attempting to combine Bremer with Dirschedl, the Examiner has replaced two characteristics of communication systems, the distinction between which is significant, and therefore distinguishes between the prior art references and Applicant's claimed invention. While the Office Action offers unsupported conclusions to read the prior art into Applicant's claimed invention, those conclusions are based only on erroneous definitions of terms of art well known by one having skill in the art and clearly differently defined by dictionaries.

As discussed above, the Applicant respectfully submits that the pending claims are allowable in all respects. Therefore, the Board is respectfully requested to reverse the rejections of pending claims 1-20.

PAYMENT OF FEES

The Commissioner is hereby authorized to charge additional fees or credit overpayments to the deposit account of McAndrews, Held & Malloy, Account No. 13-0017.

Dated: February 27, 2006

Respectfully submitted,

Christopher C. Winslade
Registration No. 36,308
Attorney for Applicant

McANDREWS, HELD & MALLOY, LTD.
500 West Madison Street, 34th Floor
Chicago, Illinois 60661

CLAIMS APPENDIX
(37 C.F.R. § 41.37(c)(1)(viii))

1. A method of restricting symbol size in an ADSL system comprising:

obtaining information regarding a data rate during initialization;

comparing the information to a threshold;

transmitting symbols using one of a multiple of 8, 4 or 2 bits per symbol if the information is above the threshold; and

transmitting symbols using an integer number of bits per symbol if the information is below the threshold.

2. The method of claim 1 wherein the information is obtained from a remote location.

3. The method of claim 1 wherein the information regarding the data rate comprises an estimated maximum receive data rate.

4. The method of claim 1 wherein the threshold is one of approximately 1 Mbits per second or approximately 250 Kbits per second, and wherein the symbols are transmitted using a multiple of 8 bits per symbol if the information is above the threshold.

5. The method of claim 1 wherein the threshold is one of approximately 2 Mbits per second or approximately 500 Kbits per second, and wherein the symbols are transmitted using a multiple of 4 bits per symbol if the information is above the threshold.

6. The method of claim 1 wherein the threshold is one of approximately 3 Mbits per second or approximately 750 Kbits per second, and wherein the symbols are transmitted using a multiple of 2 bits per symbol if the information is above the threshold.

7. A method of restricting symbol size in an ADSL system comprising:

obtaining information regarding a data rate during initialization;

comparing the information to a threshold;

transmitting a message to choose a symbol size that is one of a multiple of 8, 4 or 2 bits per symbol if the information is above the threshold; and

transmitting a message without restriction as to the size of symbols if the information is below the threshold.

8. The method of claim 7 wherein the information is obtained from a remote location.

9. The method of claim 7 wherein the information regarding the data rate comprises an estimated maximum receive data rate.

10. The method of claim 7 wherein the threshold is one of approximately 1 Mbits per second or approximately 250 Kbits per second, and wherein the message is transmitted to choose a symbol size that is a multiple of 8 if the information is above the threshold.

11. The method of claim 7 wherein the threshold is one of approximately 2 Mbits per second or approximately 500 Kbits per second, and wherein the message is transmitted to choose a symbol size that is a multiple of 4 if the information is above the threshold.

12. The method of claim 7 wherein the threshold is one of approximately 3 Mbits per second or approximately 750 Kbits per second, and wherein the message is transmitted to choose a symbol size that is a multiple of 2 if the information is above the threshold.

13. An ADSL modem system comprising:

a first modem having a first transmitter and a first receiver;

a second modem having a second transmitter and a second receiver, the second modem estimating a maximum receive data rate of the first modem and comparing it to a threshold, the second transmitter transmitting a message to the first receiver that instructs the first transmitter to transmit data using a pre-selected number of bits per symbol based on the comparison.

14. The ADSL modem system of claim 13 wherein the pre-selected number of bits per symbol is one of a multiple of 8, 4, 2 or 1.

15. The ADSL modem system of claim 14 wherein the threshold is one of approximately 1 Mbits per second or approximately 250 Kbits per second, and wherein the pre-selected number of bits per symbol is 8 if the maximum receive data rate is above the threshold.

16. The ADSL modem system of claim 14 wherein the threshold is one of approximately 2 Mbits per second or approximately 500 Kbits per second, and wherein the pre-selected number of bits per symbol is 4 if the maximum receive data rate is above the threshold.

17. The ADSL modem system of claim 14 wherein the threshold is one of approximately 3 Mbits per second or approximately 750 Kbits per second, and wherein the pre-selected number of bits per symbol is 2 if the maximum receive data rate is above the threshold.

18. The ADSL modem system of claim 14 wherein the second receiver receives a training signal that is used to estimate the maximum receive data rate of the first modem.

19. The ADSL modem system of claim 14 wherein the second modem further has a manager that estimates the maximum receive data rate of the first modem and compares the estimated maximum receive data rate to the threshold.

20. The ADSL modem of claim 14 wherein the first modem further has a manger that configures the first transmitter to transmit data using the pre-selected number of bits per symbol based on the comparison.

EVIDENCE APPENDIX
(37 C.F.R. § 41.37(c)(1)(ix))

(1) United States Patent No. 6,546,090 ("Bremer"), entered into record by Examiner in February 23, 2005 Office Action.

(2) United States Patent No. 6,262,994 ("Dirschedl"), entered into record by Examiner in February 23, 2005 Office Action.

RELATED PROCEEDINGS APPENDIX
(37 C.F.R. § 41.37(c)(1)(x))

Not applicable.